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# COMPARATIVE PHARMACEUTICO ANALYTICAL STUDY OF DRAKSHASAVA AND DRAKSHARISHTA

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## ABSTRACT

*Sandhan kalpana* is one such pharmaceutical process where *Asava* and *Arishta* are mentioned. *Asava Arishta* is unique preparation of liquid dosage form in the field of Ayurveda because it is palatable, fast acting and has longer shelf life period. *Dhataki pusha* (flower of Woodfordia fruticosa (L.) khrz) is added as fermentative initiators in *Asava* and *Arishta* preparation as per classical method. But now a days for commercial purpose yeast is used instead of these to initiate fermentation due to its cost effectiveness and wide availability. **Aim and Objective-** To know the comparative Phyto chemical difference in between the *Drakshasava* and *Draksharishta* prepared from using both *Dhataki pushpa* and yeast as fermentative initiators. **Materials and Methods -** Three samples of each *Drakshasava* and *Draksharishta* were taken for the study. Comparative pharmaceutical and physical chemical study of six samples were conducted. **Study –** Study was carried out according to *Siddhi lakshana* of *Drakshasava* and *Draksharishta* **Observations -** Pharmaceutical and physio-chemical studies of all samples of *Drakshasava* and *Draksharishta* were conducted. On the basis of organoleptic study and analytical values of both the samples of *Drakshasava* and *Draksharishta* got placed according to the standards. TLC profile, graph of UV spectrophotometry of all the samples were done. **Result and Discussion-** All the samples of *Drakshasava* and *Draksharishta* analytically matched with the standard values. **Conclusion-** All the samples of *Drakshasava*

and *Draksharishta* met with the pharmaceutical and analytical standards as mentioned in the Ayurvedic and modern parameters.

**KEYWORDS:-** *Dhataki pushpa*, Fermentative initiator, *Sandhan Kalpana*, Shelf life, UV spectrophotometry, Yeast.

## INTRODUCTION

Ayurveda, the science of life has different branches and *Bhaishajya kalpana* is one of them, which deals with Ayurvedic pharmaceutics. Fermentation is a process of preparing a formulation where in the therapeutic attributes of a group of ingredients are extracted out of either *Swarasa* or *Kwath* with the help of biochemical microbial fermentation and anaerobic respiration into the liquid. Pharmaceautico analytical study of Drakshasava and *Draksharishta* done with the 3 samples of *Drakshasava* and 3 samples of *Draksharishta*.In this paper a study of approaches applied for standardisation of *Drakshasava* and *Draksharishta* preparation and its outcome were presented in categorical manner and discussed in detail.

### Aim and Objectives

The present study was to accomplished with the following aim and objectives

**Aim**

Comparative Pharmaceutico analytical study of *Drakshasava* and *Draksharishta.*

**Objectives**

1. To prepare *Drakshasava* and *Draksharishta* according to the classical literature.
2. To study the analysis and standardization of *Drakshasava* and *Draksharishta.*

## MATERIALS AND METHODS

**Required drugs: (In classical ref.)**

**Table no. 1: Drug for *dhupana (*Fumigation).**

| Sr. no. | Ingredients | Quantity |
|---|---|---|
| 1 | *Shuddha Guggul* | 5 g |
| 2 | *Karpur* | 5 g |
| 3 | *Haridra* | 5 g |
| 4 | *Nimbatvak* | 5 g |
| 5 | *Vacha* | 5 g |

**Table no. 2: Required drugs for *drakshasava.*[1]**

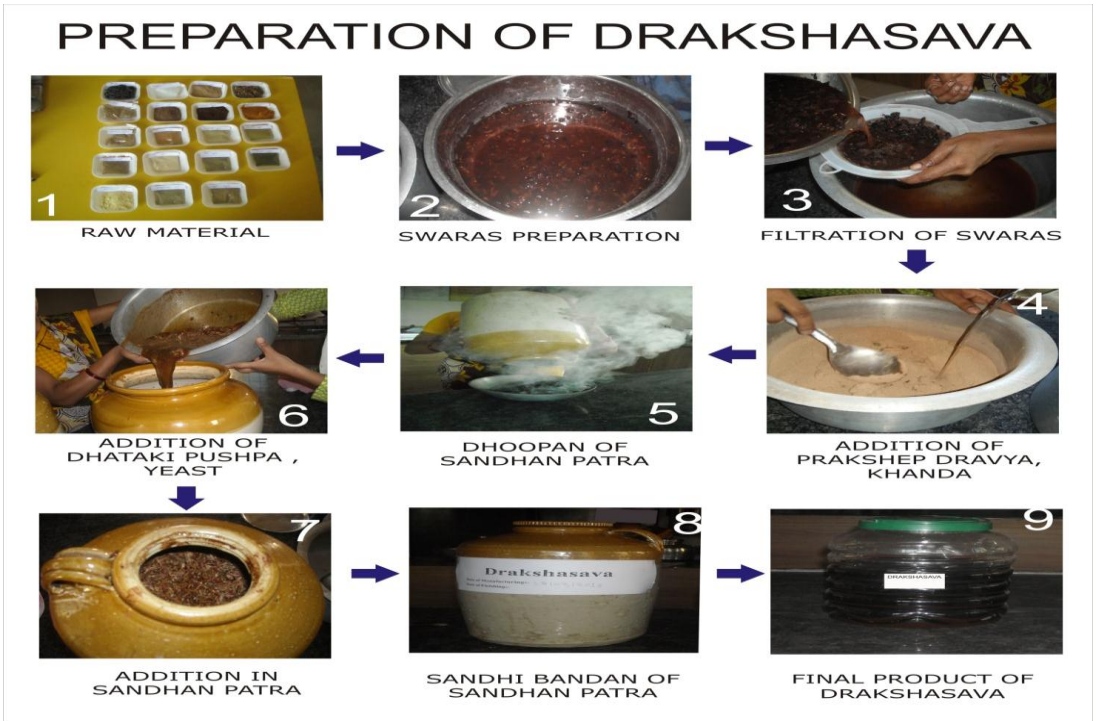
| *Name* | Latin name | Part used | Quantity |
|---|---|---|---|
| *Darksha (Manuka)* | Vitis vinifera | fruit | 250 g |
| *Khanda Sharkara* | | | 4 Kg |
| *Badara Mool* | Ziziphus sativus | Root | 500 g |
| *Dhataki pushpa* | Woodfordia fructicosa | Flower | 250 g |
| *Pugaphal* | Areca catechu | Fruit | 25 g |
| *Lavang* | Syzygium aromaticum | Fruit | 25 g |
| *Javitri* | Myristica Dactyloides auctnonjaertn | Fruit shell | 25 g |
| *Jaifal* | Myristica fragrans | Fruit | 25 g |
| *Dalchini* | Cinnamomum zeylanicum | Bark | 25 g |
| *Ela* | Elettaria cardamom | Fruit | 25 g |
| *Tejpatra* | Albier webbiara | Leaves | 25 g |
| *Nagakeshar* | Mussa ferrea | stemen | 25 g |
| *Sunthi* | Zingiber officinale | Rhizome | 25 g |
| *Marich* | Piper nigrum | Fruit | 25 g |
| *Pippali* | Piper longum | Fruit | 25 g |
| *Rumimastagi* | Pistacia lentiscus linn | Gum-resin, galls | 25 g |
| *Padyakand* | | *Kand* | 25 g |
| *Akarakarabha* | Anacyclus pyrethrum | Root | 25 g |
| *Kustha* | Saussurea lappa | Root | 25 g |
| Yeast | | | 25 g |
| Water | | | 4 Lit. |

**Method: Drug preparation**[2]

*Draksha* were soaked in 4 lit. water for overnight.

1. Filter with clean cotton cloth and measure.
2. 4 kg *Khandsharkara* added and stirred properly till it dissolved completely.
3. Powdered *Prakshepa dravya* were mixed in morter to make homogeneous mixture.
4. The jar was properly fumigated by *Vacha,Shuddha Guggul, Kapur, Haridra* and *Nimba twak.*
5. Above solution was poured into a dry , clean and pre fumigated china clay jar upto 3/4$^{th}$ part of jar, leaving 1/4$^{th}$ part empty.
6. After the addition of *Prakshepa dravya, Dhataki pushpa* and yeast were added and the solution was stirrrd carefully.
7. Then the containers were closed tightly and sealed with mud plaster.
8. The container then placed in wooden shelve in which there is minimum temperature variation.
9. Containers were kept for fermentation.

10. Containers were opened for observation and observation noted.
11. All the three batches of *Drakshasava* were prepared at the same time.




**Required drugs: (In classical ref.)**

*Dhupan dravya* as mentioned in *Drakshasava.*

**Table no. 3: Required drugs in *draksharishta.*[2]**

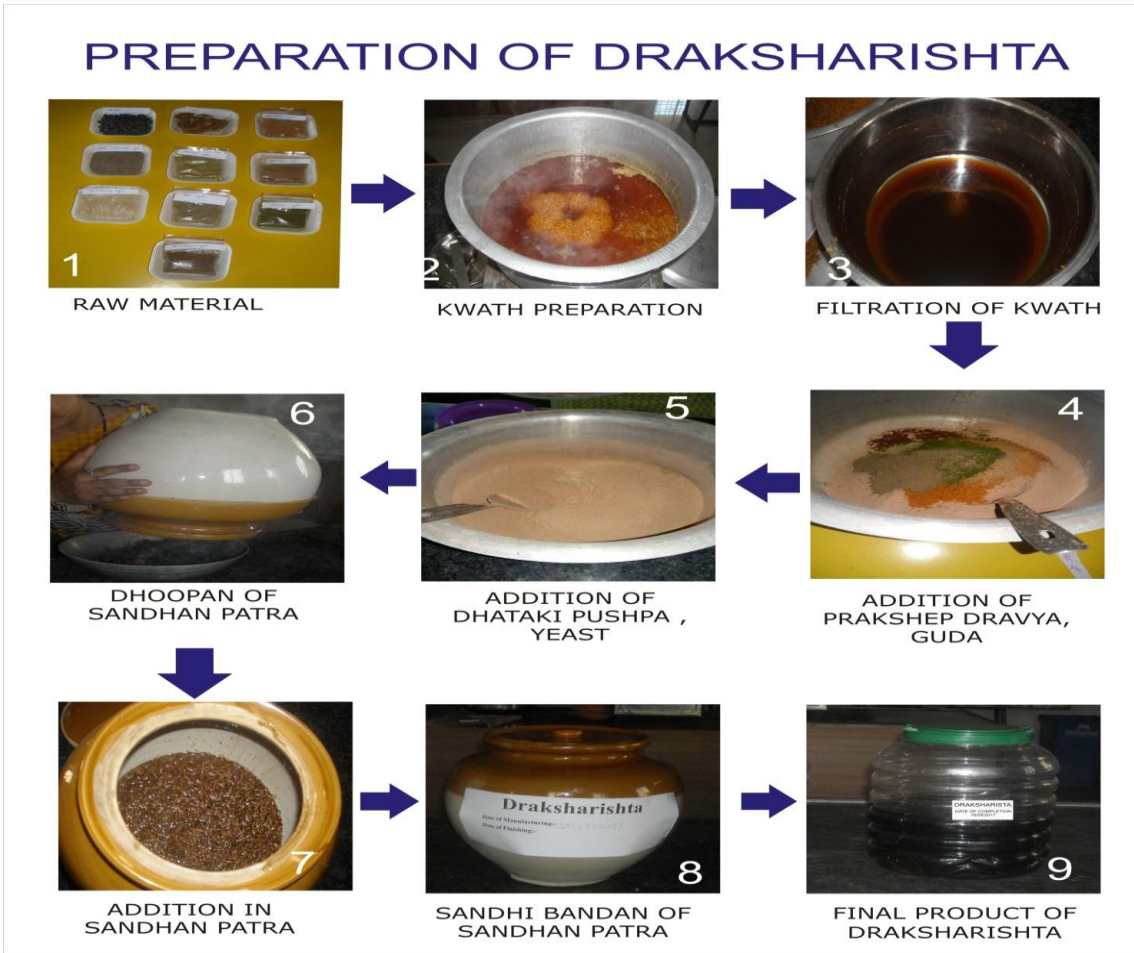
| Name | Latin name | Part used | Quantity in practical |
|---|---|---|---|
| *Draksha* | Vitis virifera | Fruit | 1.250 kg |
| *Guda* | - | | 5 kg |
| *Dalchini* | Cinamonum zeylanicum | Bark | 25 g |
| *Ela* | Elettaria cardamom | Seed | 25 g |
| *Tejpatra* | Albies Webianna | Leaves | 25 g |
| *Nagakeshar* | Mesua ferra | Stemen | 25 g |
| *Fulpriyangu* | Callicarpa macrophylla | Fruit | 25 g |
| *Marich* | Piper nigrum | Fruit | 25 g |
| *Pippali* | Piper longum | Fruit | 25 g |
| *Vayvidang* | Embeliribes | Fruit | 25 g |
| *Dhataki pushpa* | Woodfordia fruticosa | Fruit | 50 g |
| Yeast | | | 25 g |
| Water | | | $10^{1/2}$ lit |

**Method of drug preparation[5]**

1. *Draksha* were soaked in 10 $^{½}$ lit.of water for overnight.
2. Next day the *Kwath* of *Draksha* was made by reducing it to ¼$^{th}$ (2.75 lit.).

3. Kwath was filtered with clean cotton cloth and measured.
4. 5 kg jaggari was added and stirred properly till it dissolved completely.
5. Powdered *prakshepa dravya* were mixed in morter to make a homogeneous mixture.
6. The jar was properly fumigated by *Vacha,Shuddha Guggul, Kapur, Haridra* and *Nimbatwak.*
7. Above solution was poured into a dry , clean and pre fumigated china clay jar upto 3/4$^{th}$ part of jar, leaving 1/4$^{th}$ part empty.
8. After the addition of *Prakshepa dravya, Dhataki pushpa* and yeast were added and the solution was sealed carefully.
9. Then the containers were closed tightly and sealed with mud plaster.
10. The containers were placed in a wooden shelve with a minimum temperature variation.
11. Containers were kept for fermentation.
12. Containers were opened for observation and observations were noted.
13. All the three samples of *Draksharishta* were prepared at the same time.

**Diagram**



**Study**

**Table no. 4: Showing *drakshasav* ingradiant with proportions.**

| | Sample A | Sample B | Sample C |
|---|---|---|---|
| **Wt. Of Draksha** | **250 gm** | **250 gm** | **250 gm** |
| Water used for preparation | 4lit | 4lit | 4lit |
| Wt of khand sharkar | 4kg | 4kg | 4 kg |
| Wt of prakshep dravyas | 875 gm | 875 gm | 875 gm |
| Wt of *Dhatki Pushpa* | 250 gm | 250 gm | 250 gm |
| Wt of yeast | 25 gm | 25 gm | 25 gm |
| Quantity of final product | 4.6 lit | 4.8 lit | 4.6 lit |
| Time taken for fermentation | 45 days | 45 days | 45 days |

**Table no. 5: Showing *draksharishta* ingradiants with proportions.**

| | Sample A | Sample B | Sample C |
|---|---|---|---|
| Wt. Of Draksha | 1.250 kg | 1.250 kg | 1.250 kg |
| Kwath used for preparation | 2.75 lit | 2.75 lit | 2.75 lit |
| Wt of Guda | 5 kg | 5 kg | 5 kg |
| Wt of prakshep dravyas | 200 g | 200 g | 200 g |
| Wt of *Dhatki Pushpa* | 50 g | 50 g | 50 g |
| Wt of yeast | 25 g | 25 g | 25 g |
| Quantity of final product | 3.50 lit | 3.25 lit | 3.70 lit |
| Time taken for fermentation | 60 days | 60 days | 60 days |

-Three different samples of *Drashasava* and three different samples of *Draksharishta* were made with same fermentating agents *dhatki pushpa* and yeast.

- *Drakshasava* and *Draksharishta* all 6 samples were prepared $33^0$ C room temperature.

- All 3 samples of *Drakshsava* and *Draksharishta* were kept in 6 different China clay pots for fermentation process up to complete its fermentation.

**Properties of the finished drug**

1) Colour was dark brown.
2) Taste was *madhura*.
3) Smell was alcoholic.
4) No hissing sound was heard from liquid.
5) Effervesces was absent.
6) *Prakshepa dravya* were settled down at the bottom.
7) Matchstick continued to burn.
8) Limewater taste negative.

**Table no. 6: *Siddhi lakshan* of *Drakshasava and Draksharishta*.**

| Sr. No. | Test | *Drakshasava* Sample A | *Drakshasava* Sample B | *Drakshasava* Sample C | *Draksharishta* Sample A | *Draksharishta* Sample B | *Draksharishta* Sample C |
|---|---|---|---|---|---|---|---|
| 1 | Matchstick continued to burn | + | + | + | + | + | + |
| 2 | No effervescence | + | + | + | + | + | + |
| 3 | No hissing sound | + | + | + | + | + | + |
| 4 | *Prakshepa dravyas* settled down at the bottom | + | + | + | + | + | + |

**Analytical study**[22]

Standard is a Numerical value which quantity the parameters and thus denotes quality and purity of a material. Standardization of a formulation mainly includes

1. Raw material standardization
2. Process standardization
3. Finished product standardization

Analytical study plays an important role at all the above levels. This study includes

1. Physico chemical analysis
2. Estimation of functional group
3. Quantification of marker
4. Chromatographic finger printing

**A) Physico-chemical analysis:** This includes characters like pH, soluble extractives, ash content etc,

**B) Estimation of functional group:** Most of these techniques are Gravimetric or Titrimetric

**C) Quantification of marker:** The method is most convincing way of maintaining constant quality of raw material as well as of finished products.

**D) Chromatographic finger printing:** It is possible to draw a fairly reliable quality protocol for polyherbal compounds. *Asava* and *Arishta* are a special class of Ayurvedic formulations containing a self-generated alcohol. In Ayurvedic formulary of India Part-I, 37 different *Asava* and *Arishta* preparation have been included and *Drakshasava* and *Draksharishta* are among them. *Drakshasava* and *Draksharishta* have been included in A.F.I, Part I In the present study the comparative study of *Drakshasava* (prepared with

*Draksha swarasa*) and *Draksharishta* (prepared with *Draksha kwath*) have been carried out.

**Parameters used for analysis of *Drakshasava* and *Draksharishta***

**Ayurvedic parameters**

a) Clear liquid without any froth
b) Pleasant aromatic color of alcohol
c) No sour – taste
d) No effervescence sounds
e) Additives sink to the bottom
f) Burning candle burns brightly when placed in or just above the *Sandhan patra*
g) Sweetish and slightly acidic taste
h) Lime water test negative

All these analytical testing of *Drakshasava* and *Draksharishta* by ayurvedic methods were done. The samples met with these Ayurvedic parameters mentioned in the Ayurvedic texts.

**Modern method**

a) Organoleptic evaluation – Such as color, Taste, Odour.
b) Physical evolution
1) pH
2) Specific Gravity
3) Total Solids
c) Alcohol Content
d) Reducing Sugar
e) Non – reducing sugar
f) Test of methanol
g) Total acidity
h) Viscocity
i) Refractive index
j) T.L.C.
k) U. V. Spectrophotometry

## RESULTS

**Table no. 7: Oraganoleptic evaluation of *drakshasava*.**

| *Drakshasava* | | | |
|---|---|---|---|
| | **Sample A** | **Sample B** | **Sample C** |
| Colour | Dark brown | Dark brown | Dark brown |
| Odour | Aromatic | Aromatic | Aromatic |
| Taste | Sweet | Sweet | Sweet |

**Table no. 8: Analytical study of *drakshasava*.**

| Sr. No. | Test | Sample A | Sample B | Sample C |
|---|---|---|---|---|
| 1 | pH | 3.83 | 3.82 | 3.81 |
| 2 | Specific gravity | 5.4 | 5.42 | 5.41 |
| 3 | Total solid | 11.6619 | 8.8861 | 9.2401 |
| 4 | Alcohol contents | 5.32 % | 5.08 % | 4.80 % |
| 5 | Reducing sugar | 31.57 % | 33.12 % | 32.83 % |
| 6 | Non reducing sugar | 3.31 % | 2.14 % | 2.20 % |
| 7 | Test of methanol | absent | absent | absent |
| 8 | Total acidity | 0.35 g/lit | 0.34 g/lit | 0.39 g/lit |
| 9 | Viscosity | 0.0590 | 0.0784 | 0.07515 |
| 10 | Refractive index | 1.4006 | 1.3980 | 1.3996 |

**Table no. 9: TLC profile of *drakshasava*.**

| | | Distance travelled by solute | Distance travelled by solvent | Rf value | Colour of spot | Detecting reagent |
|---|---|---|---|---|---|---|
| ***Drakshasava*** | A | 5.3 | 6.5 | 0.8 | Pink | In iodine chamber |
| | B | 5.2 | 6.3 | 0.8 | Pink | In iodine chamber |
| | C | 5.6 | 6.5 | 0.8 | Pink | Iodine chamber |

**Table no. 10: Oraganoleptic evaluation of *draksharishta*.**

| *Draksharishta* | | | |
|---|---|---|---|
| | **Sample A** | **Sample B** | **Sample C** |
| Colour | Dark brown | Dark brown | Dark brown |
| Odour | Aromatic | Aromatic | Aromatic |
| Taste | Sweet | Sweet | Sweet |

**Table no. 11: Analytical study of *drakshrishta*.**

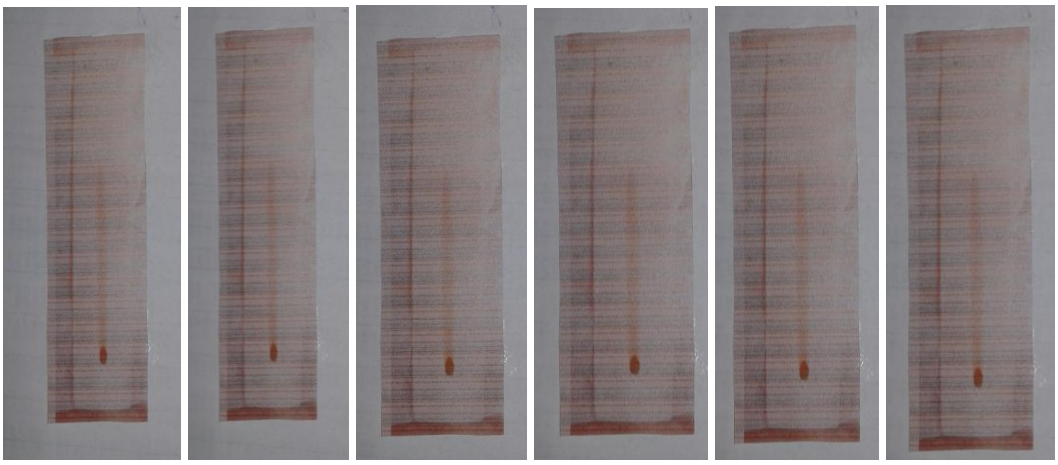
| Sr. no. | Test | Sample A | Sample B | Sample C |
|---|---|---|---|---|
| 1 | pH | 4.38 | 4.40 | 4.43 |
| 2 | Specific gravity at ($25^0$C) | 5.59 | 5.6 | 5.61 |
| 3 | Total solid | 15.1005% | 29.5601% | 7.11% |
| 4 | Alcohol contents | 8.56% | 5.60% | 4.52% |
| 5 | Reducing sugar | 41.18% | 40.43% | 40.03% |
| 6 | Non reducing sugar | 3.16% | 3.56% | 2.65% |
| 7 | Test of methanol | absent | absent | absent |
| 8 | Total acidity | 0.49 g/lit | 0.54 g/lit | 0.45 g/lit |

| | | | | |
|---|---|---|---|---|
| 9 | Viscosity | 0.02135 | 0.02783 | 0.00004757 |
| 10 | Refractive index | 1.4241 | 1.4249 | 1.4243 |

**Table no. 12: TLC profile of *draksharishta*.**

| | | Distance travelled by solute | Distance travelled by solvent | Rf value | Colour of spot | Detecting reagent |
|---|---|---|---|---|---|---|
| ***Draksharishta*** | A | 5.8 | 7 | 0.8 | Pink | Iodine chamber |
| | B | 5.6 | 6.7 | 0.83 | pink | Iodine chamber |
| | C | 5.7 | 6.6 | 0.86 | Pink | Iodine chamber |

**TLC of three sample of *drakshasava*: TLC of three sample of *drakshrishta***



**Sample A Sample B Sample C Sample A Sample B Sample C**

## DISCUSSION

*Sandhan* is a process where some liquids like water, *Kashaya* or *Swarasa* etc. are kept with substances which are either medicinal or having nutritive values, mixing with *Guda*, honey etc. placed for some time in order to achieve fermentation.

**Properties of *a Asava* and *Arishta***

***Asava-*** *Deepan, Pachan, Sugandhi, Kaphavatanut, Rasanakshimanohar, Hridya, Manasharirbalaprada.*

***Arishta-*** *Sara, Laghupaki, Deepan, Kaphvatanughata, Pittavishodhan, Bahudoshhara, Udar, pleeha* etc.

*Sandhan kalpana* includes three *Karma.*

*Purva karma* includes selection of *Patras*, *Lepana* and *Dhupan*.

*Pradhan karma* includes mixing of ingredients, filling and sealing of containers.

*Pachat Karma includes* collection of fermented *Drakshsava* and *Drakshrishta.*

Examine all the samples with Ayurvedic and modern parameters.

**Imperative issues for accurate initiation of *Sandhana kalpana***

Looking at the significance of *Sandhana kalpana* from the perspectives of pharmaceutical progress, therapeutic trends, and commercial issues, many researchers are exploring every possibility for the advancement and acceptability of these products to physicians and patients. Some of these are presented here for a better understanding of thrust areas of *Sandhana kalpana*.

***a)*** **Proportion of carbohydrates *(Madhura dravya)***

**a.** ***Madhur dravya*:** In *Drakshasava khand* was used as a madhur dravya and in *Draksharishta Guda* was used.

***b.*** ***Khand*** – It has *Madhurrasa, Viryavardhaka, Netrya, Bhruhana, Shitavirya, Vatapittashamak, Snigdha Balkarak* properties.

**c.** ***Guda*** **-** In all the classics properties *Guda* is described under the *Iksu Varga*. *Guda* is unavoidable ingredient of *Sandhana kalpana* as *Sandhana prakriya* starts whenever fermenting media act on these sugar, split into simple sugar and then due to action of some enzymes like zymase fermenting media convert it into alcohol and liberate $CO_2$.

Hence the aim to use Jaggery etc. sweetening substance was regarding fermentation. Beside this other benefits of them are.

a) Jaggery also plays a role of preservative.
b) Also it acts as a good vehicle for the absorption.
c) One more advantage of *Guda* (Jaggery) is that it is a tonic, acting as *Preenana* and *Tarpana* etc.

Temperature plays an important role in the process of fermentation. 25-40°C temperature was required in this process during this batch surrounding temperature.

Precaution taken about place and *sandhanpatra* (china clay).

For the preparation of *Asava* and *Arishta* properties of water play an important role. Here for the preparation of *Draksha-swarasa* some amount of tap water was utilized.

Microorganisms involved in the preparation of *Asava–Arishta* for fermentation require water, specific nutritive material as growth promoter and source of energy for their fermenting activity. Carbohydrate acts as the main source of nutrition in the products of *Sandhana kalpana.*

Nature and concentration of carbohydrates affect the rate of fermentation and final product produced, ie, biomass and primary and secondary metabolite. Increased concentration of carbohydrate in liquid upsurges the viscosity of solution. Only a certain group of microorganisms can survive in a higher concentration up to 65-70%. While at above 40% concentration, only few osmophilic type of yeast can grow.

*Acharya Charaka* and *Sharangadhara* have mentioned using 39.06% of sweet substances (generally carbohydrate) for the process of fermentation in *Sandhana kalpana*. But to initiate the easy and early fermentation, only 40% of sweet substances are advised to be added and the remaining quantity of sweet substances is supplemented after fermentation process begins.[37]

***b) Container***

All classical texts recommended the use of earthen and wooden containers for the fermentation process, but these have certain limitations as earthen pots may break, while wooden containers require pre-treatment. Even after all these tedious processes, there may be chances of contamination. Hence, with the development of technology in the field of pharmaceutics, these pots were replaced by plastic and steel containers. To address the question of equal efficacy with the specific variety of Containers, studies were carried out to analyze the final product, organoleptically and physicochemically. It is concluded that plastic and steel containers are suitable for carrying out the *Sandhana* process.(38,39) In this study China clay containers were used because they are bad conductor of heat, easy to clean, no chance of any contamination of drug with vessel, they remain free from chemical reaction. *Dhoopana* process prevent contamination, give fragrance and may increase the medicinal value of the final product.

***c) Temperature***

*Sandhana kalpana* is placed for the process with minimum temperature variation at the site. In the ancient time, to serve this object, containers for preparation of Asava–Arishta were placed in *Dhanya Rashi* (*Kanakbindu Arishta - Charaka Chikitsa Sthana* 7/76-79), *Bhugarbha*, *Chaulyagara* (*Kharjurasava – Gada Nigraha* 7/266-274), *Koshthasara* (*Kumaryasava - Gada Nigraha* 6/1-14), etc. This practice ensured that optimum temperature, direct avoidance of light and air, etc were maintained.

Specific microorganisms require specific temperature for optimum growth and product formation. In general, optimum temperature needed for initiation of fermentation is in the range of $20^0$ C 35°C.[40,41]

***d) Significance of sandhana dravya (Fermentor)***

Fermentor acts as a supply depot of microorganism, which initiates the process of fermentation. The *Asava–Arishtas* quoted in *Charaka Samhita* are devoid of use of the *Dhataki Pushpa* as an initiator of fermentation. *Acharya Vagbhata* was pioneer, who made the use of *Dhataki Pushpa* extensively in the manufacturing of *Asava–Arishta.* A thorough study of ancient literature reveals that following.

Drugs play the role of *Sandhana dravya* (Fermentor) in *Sandhana kalpana.*

The effect of addition of yeast (Saccharomyces cerevisiae) and *Dhataki pushpa* to fermenting media was studied. The study reveals that the onset and completion of fermentation process in the samples containing yeast were quick, as in these samples, fermentation started on the second day and was completed within one month., Another report says that the flowers of *Dhataki pushpa* are used as inoculum in the preparation of *Asava-Arishta.* Here, attempts have been made to decode its role in alcoholic fermentation. The flowers were screened for micro flora and yeast strain of S. cerevisiae, which was isolated from the flowers and its morphology reported. The flowers of *Dhataki* were found capable to initiate alcoholic fermentation as normally achieved by the use of pure yeast culture.[42]

Further, Das et al. showed that the flowers of *Dhataki* contain substantially high concentration of tannins, to the extent of 22%, and such polyphenolic compounds are susceptible to enzymatic conversion to simple phenols and alcohol during anaerobic fermentation of *Arishta* preparations. Perhaps, this justifies the extensive use of W. fruticosa in *Arishta* preparation, the main purpose of which is to produce alcohol.[43]

Contrary to this belief of Ayurveda specialists that inoculum of yeasts comes from *Dhataki flower;* Das et al. have different opinion and findings. They argued that an endogenous invertase (fructofuranosidase) found in *Dhataki* flowers helps in sucrose hydrolysis to alcohol. The alcohol production helps in promoting the extraction of biologically active components including gallic acid from plant materials, and absorbs active principles in the gastrointestinal tract. This alcohol, in turn, resists the growth of any microorganism in *Arishta* preparations

for years together. Increased content of gallic acid, which is otherwise present in traces, if at all, as well as the Ayurvedic process of 'self-generating alcohol' insinuates a conjecture. Here, the researchers referred earlier have tried to establish that *Dhataki* flower is an essential component of *Asava–Arishta*, not only for initiation of fermentation, but for enhancing clinical efficacy as well.[42] This concept was supported by the fact that, in some of these formulations, *Dhataki* is not a compulsory ingredient, so it may be perceived that role of *Dhataki* is not a carrier of the inoculums only.[44]

**Analytical study**

Regarding the analytical study of test formulations, here organoleptic characters, physico-chemical parameters, estimation of alkaloid contents, chromatographic study and also UV spectro photometric studies were carried out for the comparative assessment between *Drakshasava* and *Draksharishta*. Organoleptic characters were almost similar in both *Drakshasava* and *Draksharishta*.

**In the physico-chemical test**

Ayurvedic parameters organoleptic characters:

Physical evaluation: pH of all samples was found within normal range and as per standart value Specific gravity of *Draksharishta* was more than *Drakshasava,* Total solid content of *Drakshasava* was less than *Draksharishta*, alcohol percentage of *Drakshakasava* and *Draksharishta* was in normal range respectively as per standard value.

Alcohol content of *Drakshasava* was less than *Draksharishta*, Reducing sugar of *Drakshasava* was more than *Draksharishta,* Non-Reducing sugar of *Drakshasava* was more than *Draksharishta*, Test of methanol was absent in both of *Drakshasava* and *Draksharishta*, Total acidity was more in *Draksharishta* than *Drakshasava*, Viscosity was more in *Drakshasava* than *Draksharishta*, Refractive index was more in *Draksharishta* than *Drakshasava*, the TLC of *Drakshasava* and *Draksharishta* shows homogenous mixture having various chemical constituent presents in it., Uv spectrophotometry was also done.

**CONCLUSION**

Comparative pharmaceutical analytical study of *Drakshasava* and *Draksharishta* has been done the following conclusion were made on the basic of observation and result obtained.

*Sandhana Kalpana* is a successful developmental invention to overcome many more short

comings of five basic *Kalpana*. *Asava* & *Arishta* are two different terms used in the classics, though these are intermingled terms in the classics itself, but cannot be used as Synonyms: of each other. Difference between the terms *Asava-Arishta* was firstly pointed out of *Chakrapani*; later on it was clearly defined by *Sharangadhara*. Differentiating points can be seen in the literature, in definition, procedure and the properties are explained.

From the result of practical study it can be concluded that temperature and percentage of Jaggery and *khand* play an important role in the process of fermentation. *Dhataki pushpa* and yeast proves more beneficial for the augmentation effect of fermentation. Fermentation process starts within 3-4 days and gets completed within 45-60 days for, *Drakshasava* and *Draksharishta* respectively.

1. pH of *Drakshasava* was less than *Draksharishta*. .pH value fundamentally represents the value of Hydrogen ion concentration of the product to determine whether it is acidic or basic.
2. Specific gravity of *Drakshasava* was less than *Draksharishta*.Specific gravity is the weight of given volume of the liquid specific temperature compared with the weight of equal volume of water of the same temperature.
3. Total solid contents of *Drakshasava* was less than *Draksharishta*.
4. The total solid contents are a measure of the amount of material remaining after all the water has been evaporated.
5. Alcohol content of *Drakshasava* was less than *Draksharishta*.Alcohol content was lower than those in fortified wines and distilled spirits.
6. Reducing sugar of *Drakshasava* was less than *Draksharishta*. A reducing sugar is a type of carbohydrate or natural sugar that contains a free aldehyde or ketone group. Reducing sugars can
7. react with other parts of the food, like amino acids, to change the color or taste of the food.
8. Non-Reducing sugar of *Drakshasava* was less than *Draksharishta*. Non reducing sugar Sucrose is the most common linkage between the glucose and fructose units in sucrose, which involves aldehyde and ketone groups, is responsible for the inability of sucrose to act as a reducing sugar.
9. Test of methanol was absent in both of *Drakshasava* and *Draksharishta*. Methanol is frequently used as a denaturant additive for ethanol manufactured for industrial uses. This addition Of methanol exempts industrial ethanol commonly known as"denatured alcohol" or "methylated spirit" from liquor.

10. Total acidity of *Drakshasava* was less than *Draksharista*. Acid value indicates the total acid present in the product acids are produced in the product. Acids are produced during preparation is especially during fermentation stage and it responsible for sour taste.
11. Viscosity of *Drakshasava* was more than *Draksharishta*. Viscosity of liquid is constant at a given temperature and is an index of its composition. Hence it can be used as a means of standardizing liquid drugs.
12. Refractive index of *Drakshasava* was less than *Draksharishta*.Refractive index is used to measure the concentration of a solute in an aqueous solution. For a solution of sugar, the refractive index can be used to determine the sugar content. It can be used also in determination of drug concentration.
13. The TLC of *Drakshasava* and *Draksharishta* was done. Thin layer chromatography is particularly valuable for the qualitative determination of small amount of impurities. The technique is frequently used for evaluating medicinal plant materials and their preparations.
14. Uv spetrophotometry was also done. Ultraviolet and visible absorption techniques encompass analytical method based upon measurement of light absorption by substances in the wavelength region from 190 to 900nm. The UV spectrum serves as a confirmatory evidence of identity in support of other analytical data and is also used as detector in HPCL.

There was no any gross comparative difference found in observation during pharmaceutical study and analytical study in *drakshasava* and *draksharistha*. Both preparations were good. Which preparation was best not decided on the basis of pharmaceutical and analytical study, for that clinical study should be done for proving the efficacy of drugs.

## REFERENCES

From books

1. Bharat bhaishajya ratnakar, v jain publisher, 2005; 7: 90.
2. Sharanga samhita, dr. V tripathi, chaukhamba bharati academy Varanasi, 2012.
3. Acharya Siddhinandan Mishra, *Bhaishajya kalpana vigyan*, Choukhamba Surbharati Prakashan, 2001; 4: 249-269.
4. Vaidya Dhamankar *Ayurvediya aushadhikaran*, 1954; 31: 185-215.
5. Dr. Ravindra Angadi, A text book of *Bhaishajya kalpana vigyan*, pharmaceutical science, Choukhamba Prakashan, 2016; 287-298.

6. Baishajya kalpana vighyan, Dr. P Rao, Chaoukhamba prakashan, 2009.
7. Vd. G.Gune, Ayurveda aushadhigundharmashastra, 2005.
8. Dr. Bramhanandan Tripathi, Charak samhita Choukhamba Surbharati Prakashan, 2009.
9. Acharya Vidhyadhar Shukla, Prof. Ravidatta Tripathi Charak Samhita, chaukhamba sankrit pratishtan, Delhi, 2009.
10. Kaviraj ambikadatta shastri, Sushrut samhita, ayurved sandipika by chaukhamba Sanskrit santhan Varanasi,
11. Datta ballal borarkar, Sarth susruth samhita, raghuwanshi prakashan
12. Prof. P.v. tiwari Kashyap samhita, chaukhambha vishvabharati varanasi, 2008.
13. Shri laxmipati, Yogratnakar, chaukhamba prakashan.
14. Bhaishajya ratnavali ambika datta shastri chaukhamba Sanskrit sansthan Varanasi, 2012.
15. Bhavprakash part I, shri bramhashankar mishra chaukhamba Sanskrit sansthan Varanasi, 1999.
16. Ayurvedic pharmacopeia of india part I & II.
17. Prof. P.v. Sharma Classical uses of medicinal plants chaukhamba bharati academy Varanasi, 1996; 187.
18. P.v. Sharma, Dravyagun vigyan vol II chaukhamba bharati academy Varanasi, 2005.
19. Ayurved sara sangraha, baidhyanath ayurved bhavan, 2004.
20. Dr. Deshpande, Dravyagun vigyan, anmol prakashan, 2007.
21. AFI of India part I Publish by the controller of publication civil line Delhi, 1978; 1.
22. Dr. Sudindra honward, A handbook of standardization of ayurvedic formulation, chaukhamba orantalia Varanasi, 2012; 1.
23. Dr. Devendra joshi, Quality control and standardization of Ayurvedic medicine chaoukhamba orantalia Varanasi, 2011; 1.
24. Dr. Narendra Saraogi, Preparation an uses of Asava and Arishta, chaoukhambha krishnadas academy, Varanasi, 2009; 1.
25. Dr. Gyanendra Pande, Dravyaguna vijnana, Vol I,II chaoukhambha krishnadas academy, Varanasi, 1998; 1.

From journal

26. Anand Chaudhary -A progressive review of Sadhana Kalpana (Biomedical fermentation): An advanced innovative dosage form of Ayurveda, Ayu Jul-sep, 2011; 32(3): 408 -417.
27. Narendra Bhatt – Acritical Review of Standardization of Ayurvedic *ASAVA- ARISHTA* Part -II approaches and outcome ,world journal of pharmaceutical research, 2016; 5(5): 1565-1577.

28. C Das -Analytical Methods for standardization of Ayurvedic *Asava* and *Aristha* a review, Indian J Pharm Science, 2019; 81(3): 396-405.

Dessertation

29. Dr. shailaja kulkarni: A comparative and pharmaco-clinical study of vasarishta and vasa-kasava in the management of shvasa, G.A.U., 2001.
30. Dr. Rupa lakhani: A pharmaceutico clinical study of arka kalpana and arishta kalpana w.s.r. to Jeerakarishta on grahani, G.A.U., 2002.
31. Dr. Jarsania Alpesh:A comparative and pharmaco clinical study of Bharangyadi guda and Bharangyadi arishta in managenment of shvasa, G.A.U., 2003.
32. Dr muralidhar R.: A pharmaceutical standardization of different samples of Shirisharishta, G.A.U., 2004.
33. Dr j. Clarence Davy: Pharmaceutical and experimental study of Vasakasava w.s.r. to Svayathu, R.G.U, 2005; 188.
34. Dr. Sudhindra A.N.: The role of different fermentative in sandhan kalpana w.s.r to Balarishta, R.G.U, 2005.
35. Dr. Kinnari Dhruve: A comparative pharmaceutical study on khadirarishta w.s.r. to fungal growth in arishta and its effect on kushtha G.A.U, 2007.
36. Dr. Sonawane Smita: Comparative pharmaceutical analytical study of Draksharishta with special reference to fermentation process, M.U.H.S, 2015.
37. Gandhi P, Chaudhary A K, Ravishankar B, Dey S, Prajapati P K, A comparative study of different formulations of Vasa (Avaleha, Sneha, Sandhan)wsr to its Swasahar effect, MD (AY) dissertation of IPGTRA, Gujarat Ayurveda University, Jamnagar, 2005.
38. Hiremath SG, Joshi D. Role of different containers and methods on alcoholic preparations with reference to Kutajarista, Ancient Science of Life, 1991; 10(4): 256-63.
39. Bajaj V, Chaudhary AK. Validation Process in “Sandhan Kalpana”, Sachitra Ayurveda, 2002; 5: 846-8.
40. Kulkarni S, Chaudhary AK. Sandhan Kalpana. A Bird’s Eye View, Sachitra Ayurveda, 2003; 4: 768-75.
41. Lakhani R, Chaudhary AK. A Comparative Pharmaceutico- clinical study on Arka Kalpana and Arishta Kalpana w.s.r. to Jirakadyarka and Jirakadyarishta on Grahani, Sachitra Ayurveda, 2004; 8: 145-8.
42. Atal CK, Bhatia AK, Singh RP. Role of Woodfordia fruticosa Kurz (Dhataki) in the preparation of Asavas and Arishtas. J Res Ayur Siddha, 1981; 3: 193-9.

43. Das PK. Woodfordia fruticosa: Traditional uses and recent findings. J Ethnopharmacol, 2007; 110: 189-99.
44. Alam M, Rani G, Sathiavasan N, Dasan KK, Ali SU, Purushothamam KK. Microbiological screening of Dhataki flowers. J Res Ayurveda Siddha, 1981; 2: 371-5.